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ELECTRIC POWER SYSTEMS SIMULATOR

JPL's Utility Systems Program is designed to help integrate energy sources into the nation's electric utilities and to examine related future changes in utility system design and operations.

One recent development of the program is the JPL-designed Electric Power Systems Simulator, a miniature computerized representation of a utility system complex in simplified form. The simulator portrays graphically a 24-hour cycle of utility system operation and shows the effects on the system of new alternative energy sources, such as solar and wind-driven generators. The simulator visualizes operational problems that can arise when power loads or generation fluctuate. It also provides an overall system operations view to assess whether to use individual alternative sources, or various mixes of power generation and storage.

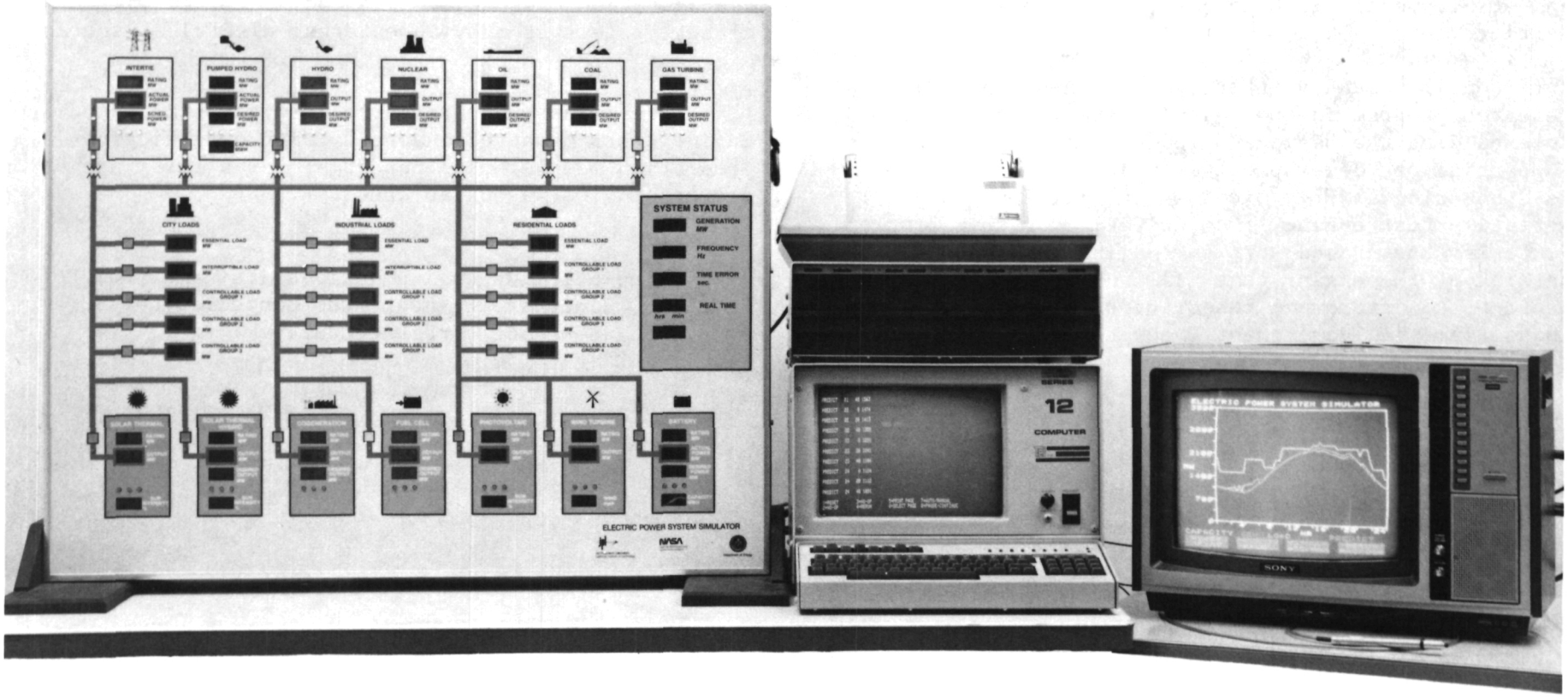
Any kind of a utility day -- actual or hypothetical -- can be portrayed by the simulator. The season can be selected, as can the geographic location. As an educational tool, the unit can be programmed for varying degrees of operator interaction. For example, given a load curve, it will generate a partial response, leaving some decisions to the operator.

A portable tabletop device, the simulator hardware comprises a micro-processor-driven display, a black-and-white video monitor with keyboard input to the microprocessor, and a color video monitor for display of predicted and actual load curves and power generation.

Completed early in 1980, the simulator has been demonstrated in the United States and Canada. It has proven useful in helping government and business leaders appreciate the complexity of present utility operations and anticipate the potential problems arising from alternative energy sources in the future. Capabilities of the simulator will be expanded as future utility requirements are identified and analyzed.

The Electric Power Systems Simulator was developed for the Department of Energy's Electric Energy Systems Program and the NASA Energy Systems Division.

Figure (opposite page): The JPL Electric Power Systems Simulator is a tripartite table-top device including (left to right): a microprocessor-driven display, the video monitor with keyboard input to the microprocessor, and the color video monitor which displays predicted and actual load curves and power generation.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ELECTRIC POWER SYSTEM SIMULATOR
NASA
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